

**APPENDIX**

Application Number 10/724,316

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### CALCULATION OF ROTOR PERIPHERAL SPEEDS

#### Applicants' Example 3

As described in Example 3, applicants constructed a machine with a collector rotor having a diameter of 15" turning at 65 revolutions per minute.

The peripheral velocity is calculated as

$65 \text{ revolutions/minute} \times 15 \times \pi \text{ inches/revolution} \times 1 / 12 \text{ inches /foot} \times 1/5280$   
 $\text{feet / mile} \times 60 \text{ minutes/hour} = 2.9 \text{ miles per hour, or}$   
 $2.9 \text{ miles/hour} \times 5280 \text{ feet/mile} \times 1 / 3600 \text{ seconds / hour} = 4.25 \text{ feet/second.}$

Similarly for Example 4, the rotor turned at 276 rpm with a peripheral rotor velocity of 12.3 mph (18.0 feet/sec.) For Example 8, the rotor turned at 138 rpm with a peripheral rotor velocity of 6.16 mph (9.0 feet/sec).

#### Kobayashi Apparatus

The Kobayashi drawing in Figure 2 can be used to calculate the peripheral velocity of that machine. Using the enlarged view of Figure 2 which follows on the next page, and a millimeter scale to measure the wheel, sprocket, and brush diameters, the peripheral velocity of the brush (PVbrush) can be calculated as a ratio of the ground speed of the machine (Vmachine):

$$PV_{\text{brush}} = 9.6/24.5 \times 36.5/7.5 \times V_{\text{machine}} = 1.91 V_{\text{machine}}.$$

Typically, such a machine can be operated safely and effectively at about one mile per hour. For a machine forward speed of 1.0 mile /hour, the PVbrush would be:

$$PV_{\text{brush}} = 1.91 \times 1.0 = 1.91 \text{ mile / hour (2.8 feet/sec).}$$